

Breeding Shorebird science for Conservation Outcomes In Arctic Alaska



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A photograph of a bird, possibly a shorebird, standing in a field of dry, brown grass. The bird is facing left, with its head turned slightly towards the camera. Its wings are spread wide, showing a mix of brown, black, and white feathers. The background is a soft-focus field of similar dry grass.

Background:

- Started in Arctic in 2001, amid renewed debate over drilling in Arctic National Wildlife Refuge
- Absence of science re “Oil Footprint”
- Importance of Western Arctic Alaska and National Petroleum Reserve
- Emerging effects of the Changing Climate

Conservation of a “Nursery” of international migratory birds



Parasitic Jaeger (Tropical Oceans)



**Yellow-billed Loon
(Korea East Sea)**



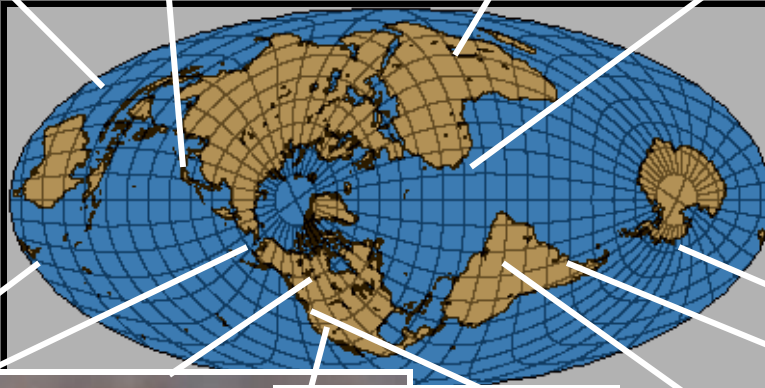
**Yellow Wagtail
(East Africa)**



**Red Phalarope
(Upwellings in Oceans)**



Bar-tailed Godwit (New Zealand)



**Arctic Tern
(Antarctica)**



Spectacled Eider (Bering Sea)



**Hoary Redpoll
(Boreal Alaska)**



**White-fronted Goose
(California)**



**Tundra Swan
(Oregon)**

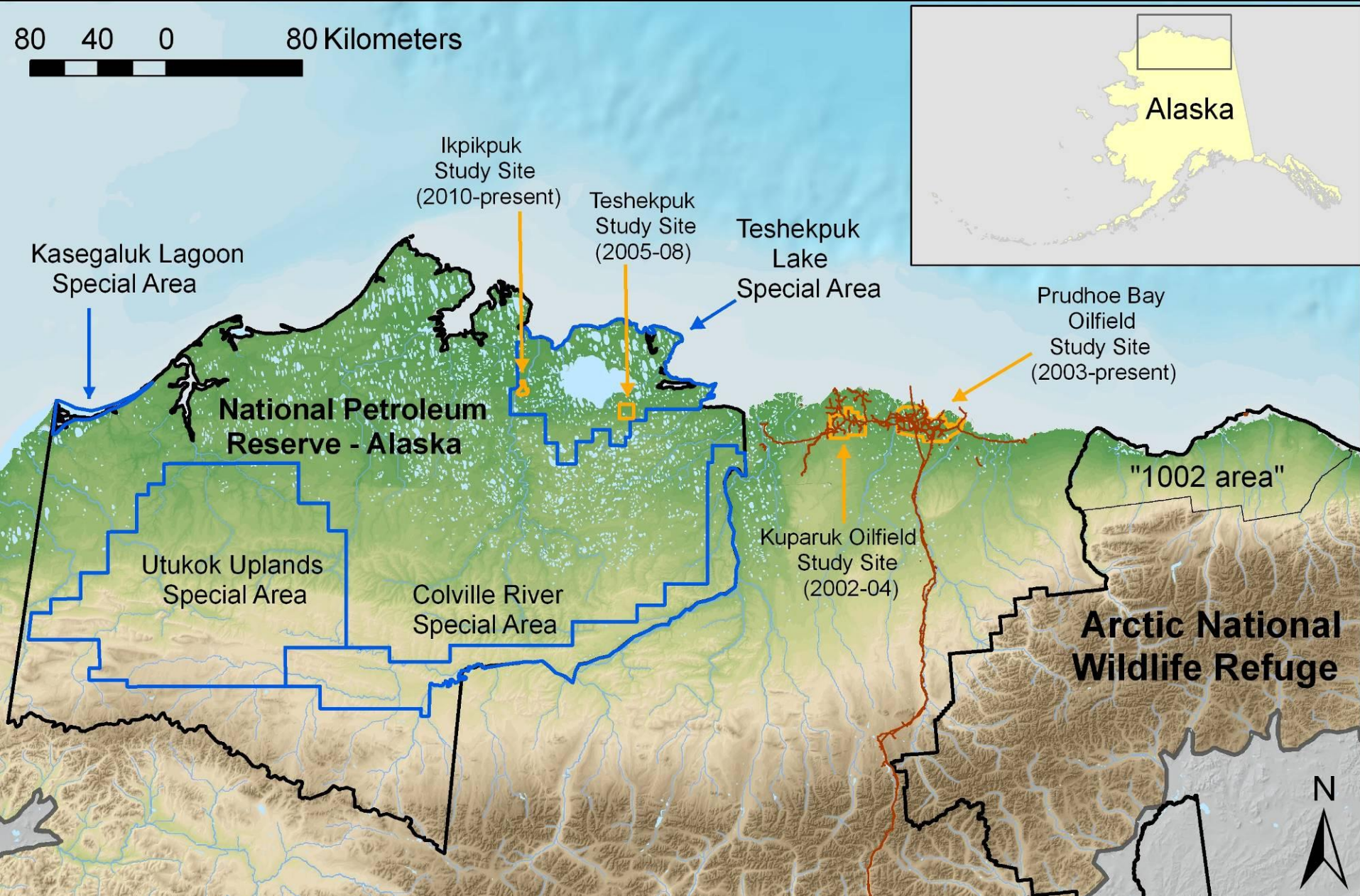


**Semipalmated Sandpiper
(Northern South America)**



**Pectoral Sandpiper
(Southern South America)**

The political landscape & WCS study sites



The Energy “Footprint” on Wildlife:

Effect of increased predators on nesting migratory birds



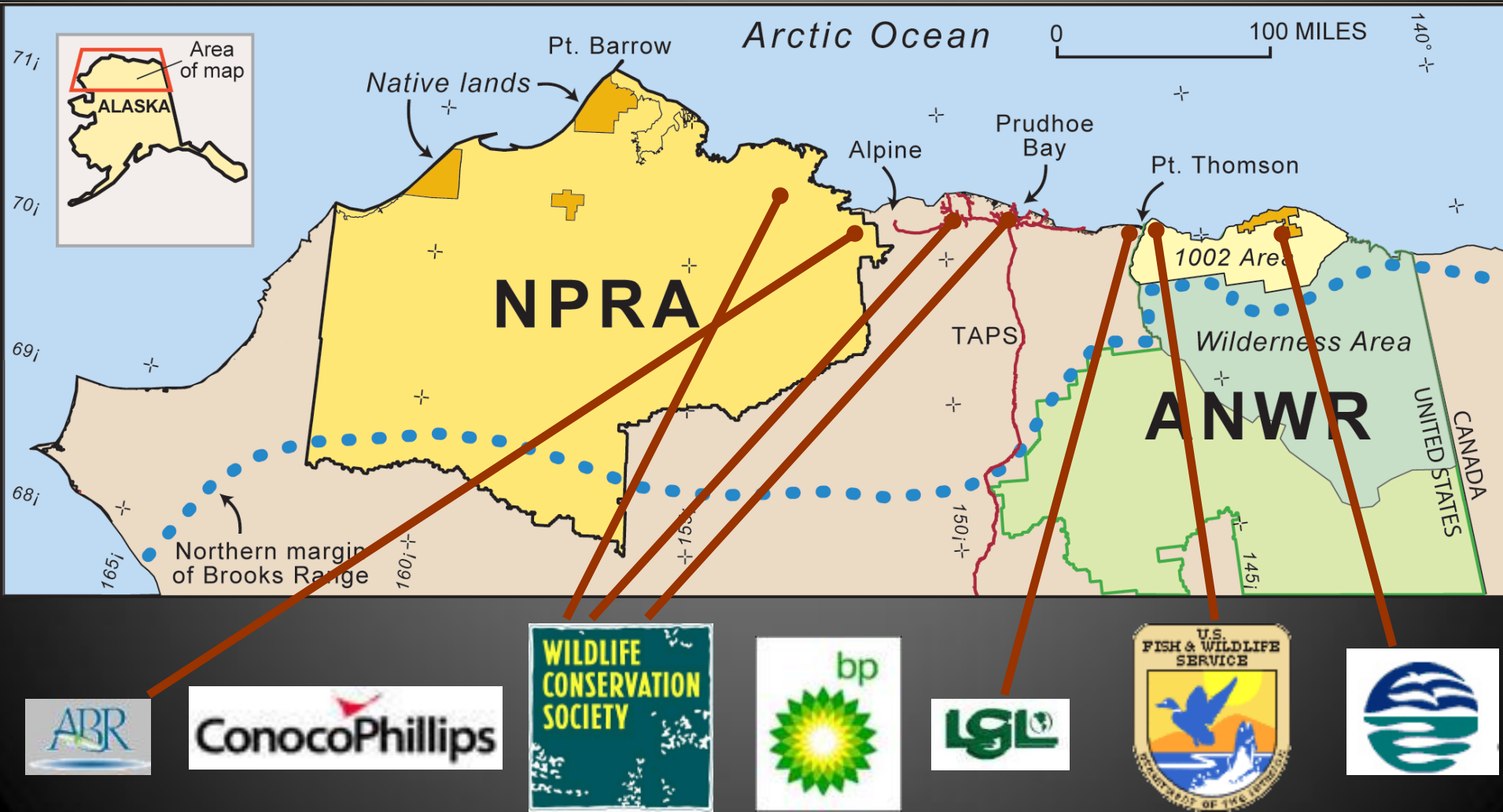
Oil Infrastructure

Increased Predators

> Nest Predation

Testing the Oil “Footprint” on Wildlife

Diverse partners across wide region



Human-
Infrastructure

Natural

Covariates:

Year
Site
Landform/Habitat
Nest Concealment
Snow Cover
Lemming Abundance
Non-Subsidized Predator
Subsidized Predator
Distance to Structure
w/food (H,M,L)
Distance to other
Structures
Gravel Density

**Cox proportional hazards regression models
for nest survival:**


- 1) a priori background model of natural covariates
- 2) added infrastructure and subsidized predator covariates

1257 nests of 13 shorebird species
619 nests of 4 songbird species

Test: Does Nest Survival Decrease in Proximity to Human-Infrastructure?

J. Liebezeit *WCS*, S. Kendall *USFWS*, S. Brown *Manomet*, C. Johnson *ABR, Inc.*,
P. Martin *USFWS*, T. McDonald *West Inc.*, D. Payer *USFWS*, C. Rea *ConocoPhillips*,
B. Streever *BP*, A. Wildman *ABR, Inc.*, S. Zack *WCS* **2009 Ecological Applications**

Results:

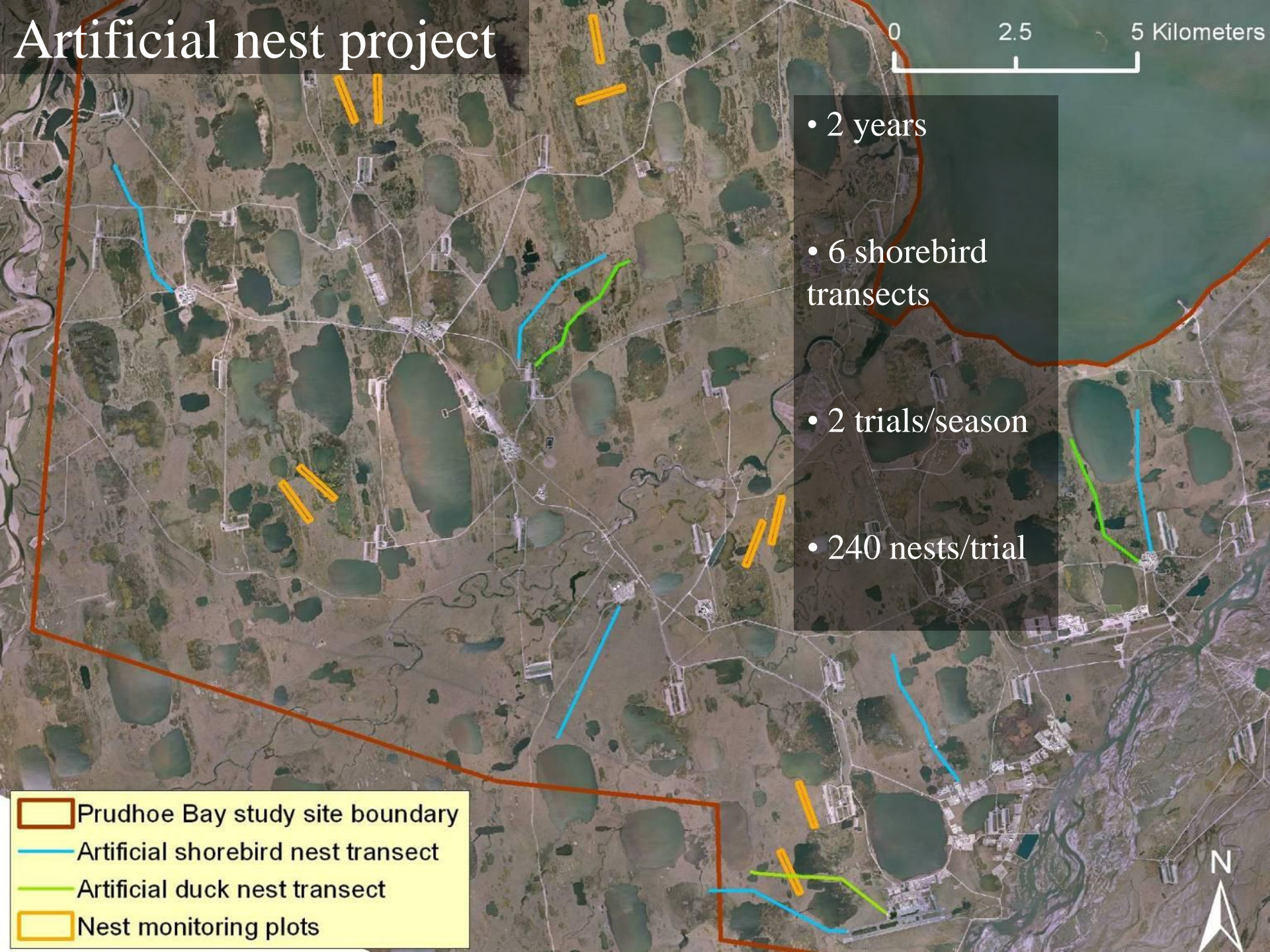
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- **Lapland longspurs and Phalaropes, show effects of proximity to infrastructure and productivity**
 - **No overall relationship between shorebird infrastructure demonstrated**
 - **Great natural variation between sites, among years in nest predation, predator numbers**

Follow-up study...Artificial nest project

- Simulated shorebird and duck nests
- Control elements of study design better than in previous effort
- Predation rates at different distances from high-use infrastructure

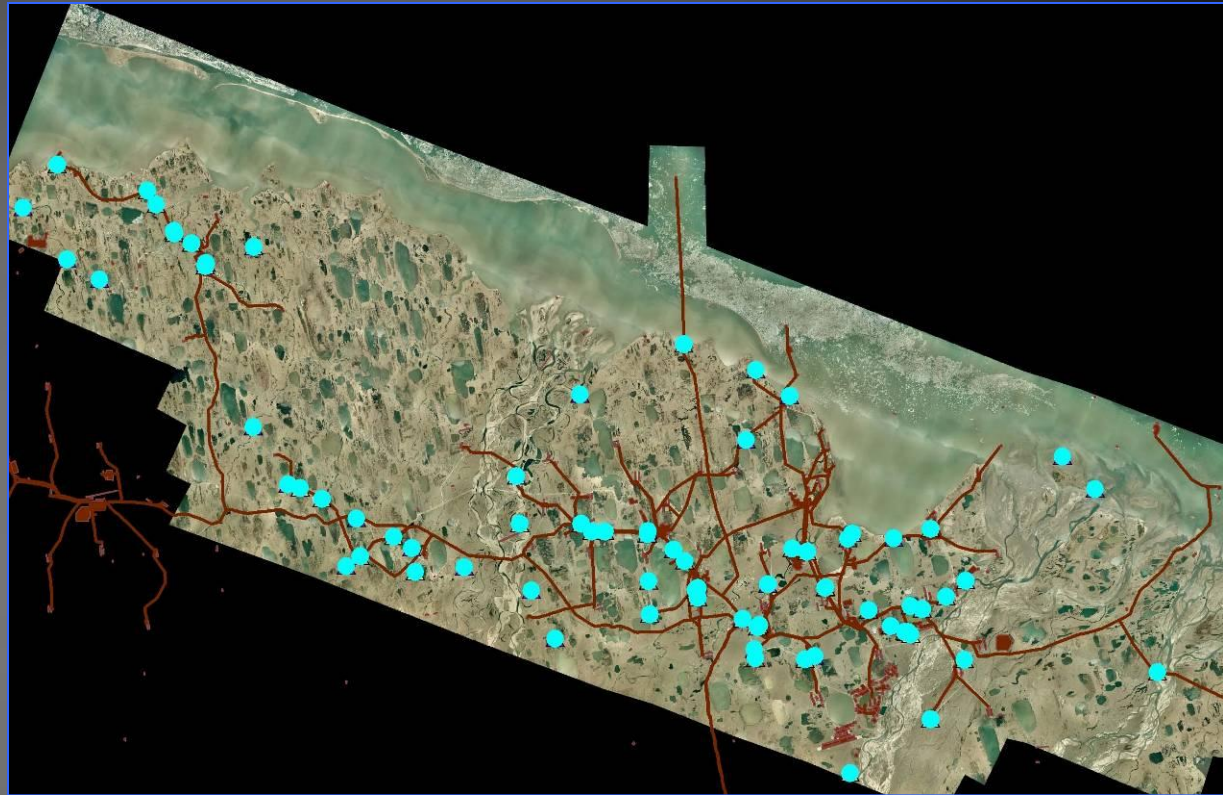


Artificial nest project



Bird use of rehabilitated oil field pads

- 80 abandoned pads
- No assessment of wildlife response
- Assess bird diversity, frequency of use, nesting: rehab vs. undisturbed sites
- Habitat selection for nesting, brood-rearing, feeding
- Provide the highest quality reclaimed habitat for nesting birds



Arctic Fox - Main Nest Predator in Oil Fields

(Liebezeit and Zack 2008
Arctic 61: 153-161)



Predator ID – developed vs. remote

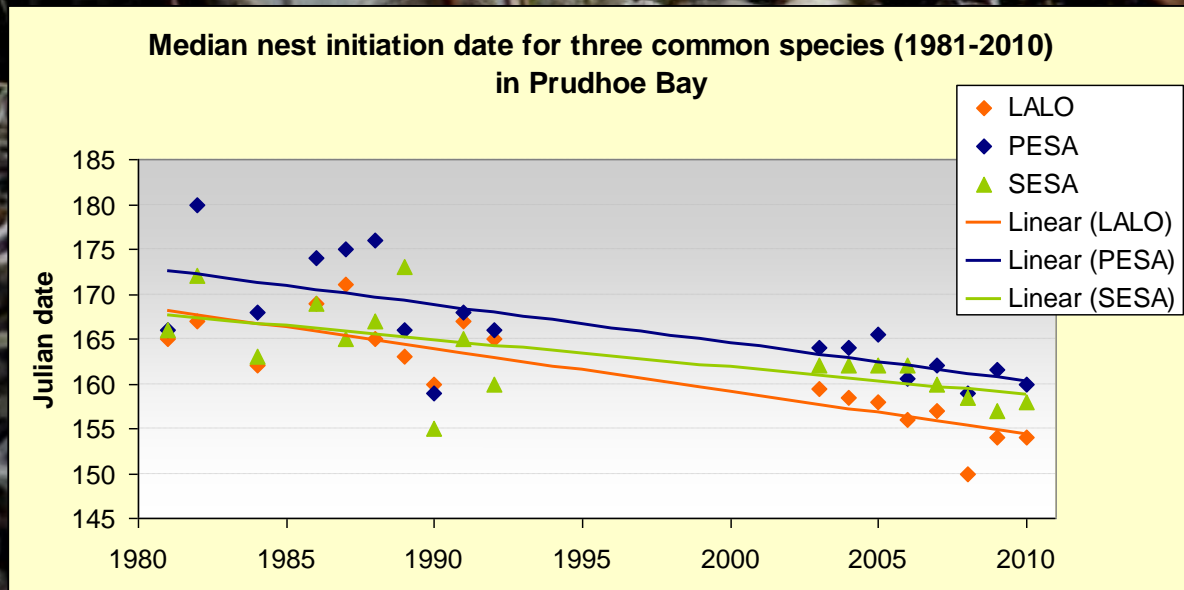
Recent images from nest cameras:



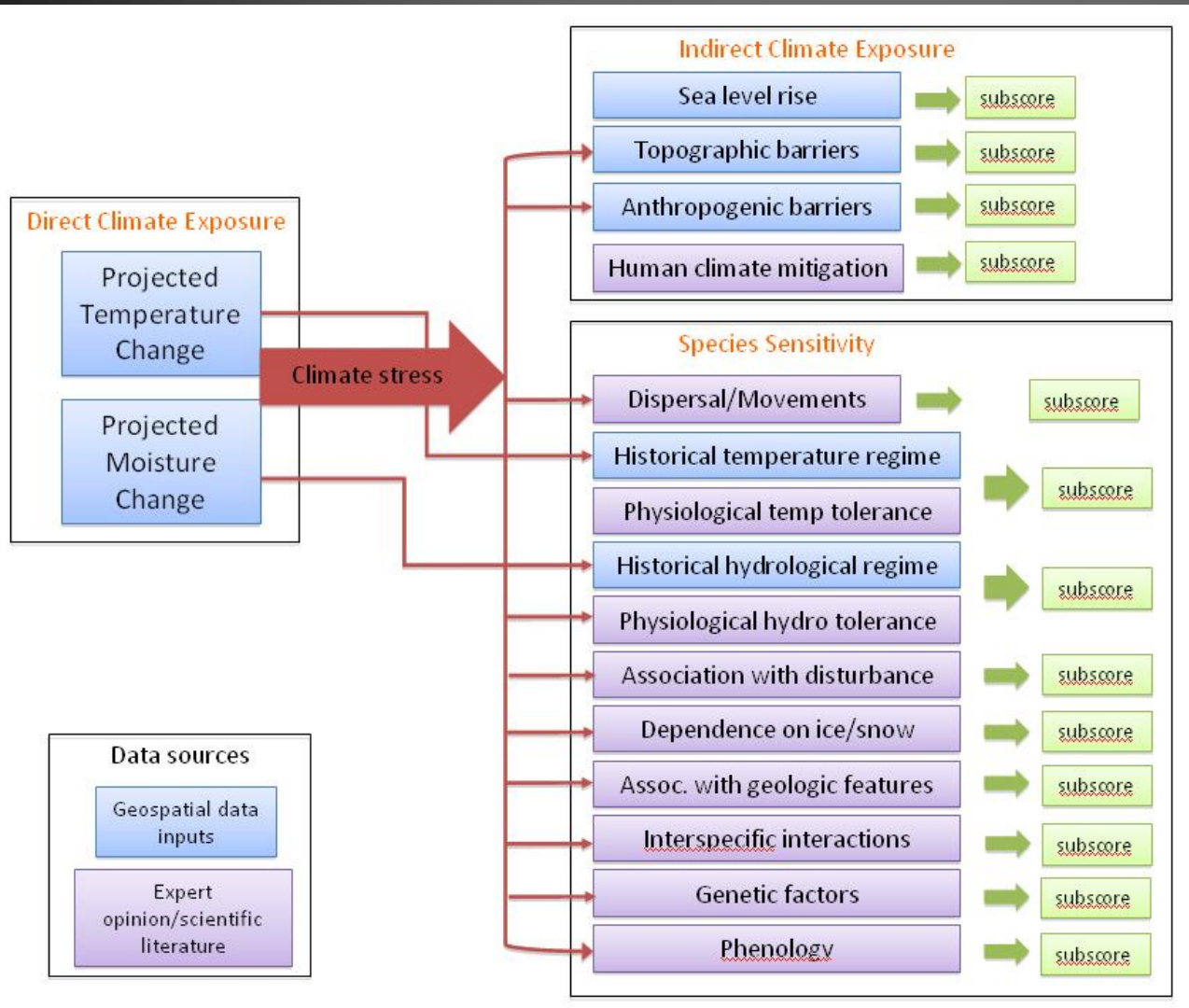
Predator	Prudhoe Bay	Ikpikpuk
Arctic fox	12	5
Red fox	8	2
Parasitic jaeger	1	1
Common raven	1	0
Snowy owl	1	0
Arctic ground squirrel	0	8

Climate Change: earlier nesting for most common species at Prudhoe Bay . . .

(80's-90's data
from D. Troy)



Vulnerability assessment for Arctic Alaskan breeding birds



- 54 species considered
- 17 shorebirds
 - Breeding, passage, wintering ground
- 50+ experts
- an initial step in managing wildlife with respect to climate change

NPR-A Special Areas: “... *Afforded maximum protection*
... *consistent with exploration issues*”





Remote field camp: Novel data on shorebird/songbird diversity, density, productivity

Wildlife and Teshekpuk

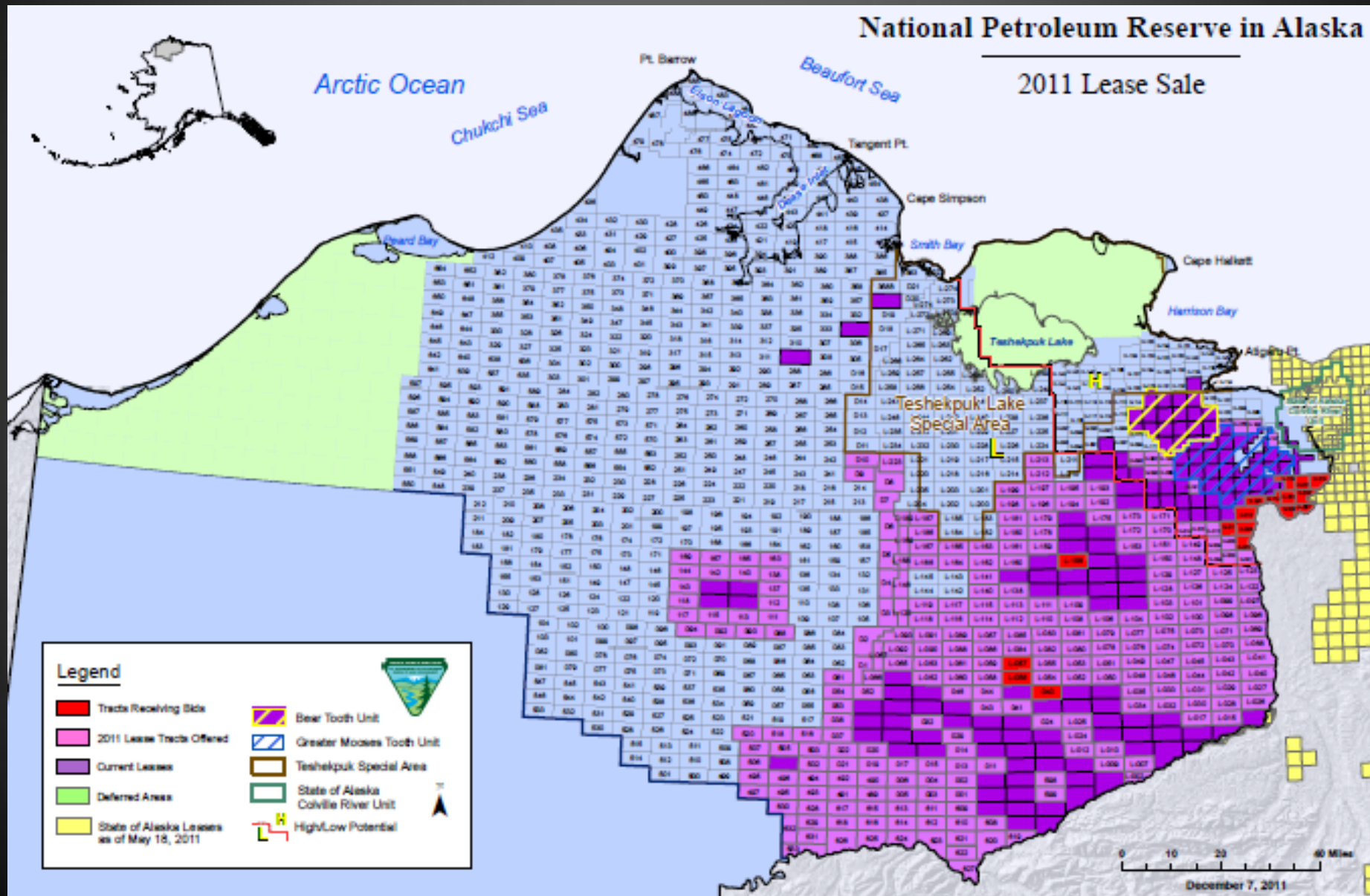
WCS demonstrates the

- High nest density
- High productivity of migrating birds south of Teshekpuk Lake (compared to other areas in Arctic Alaska)

Liebezeit, White and Zack. 2011. Arctic



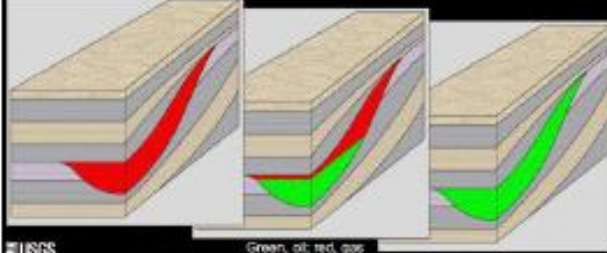
Most recent BLM lease map



Effects of Exhumation on Alpine Play in NPR-A

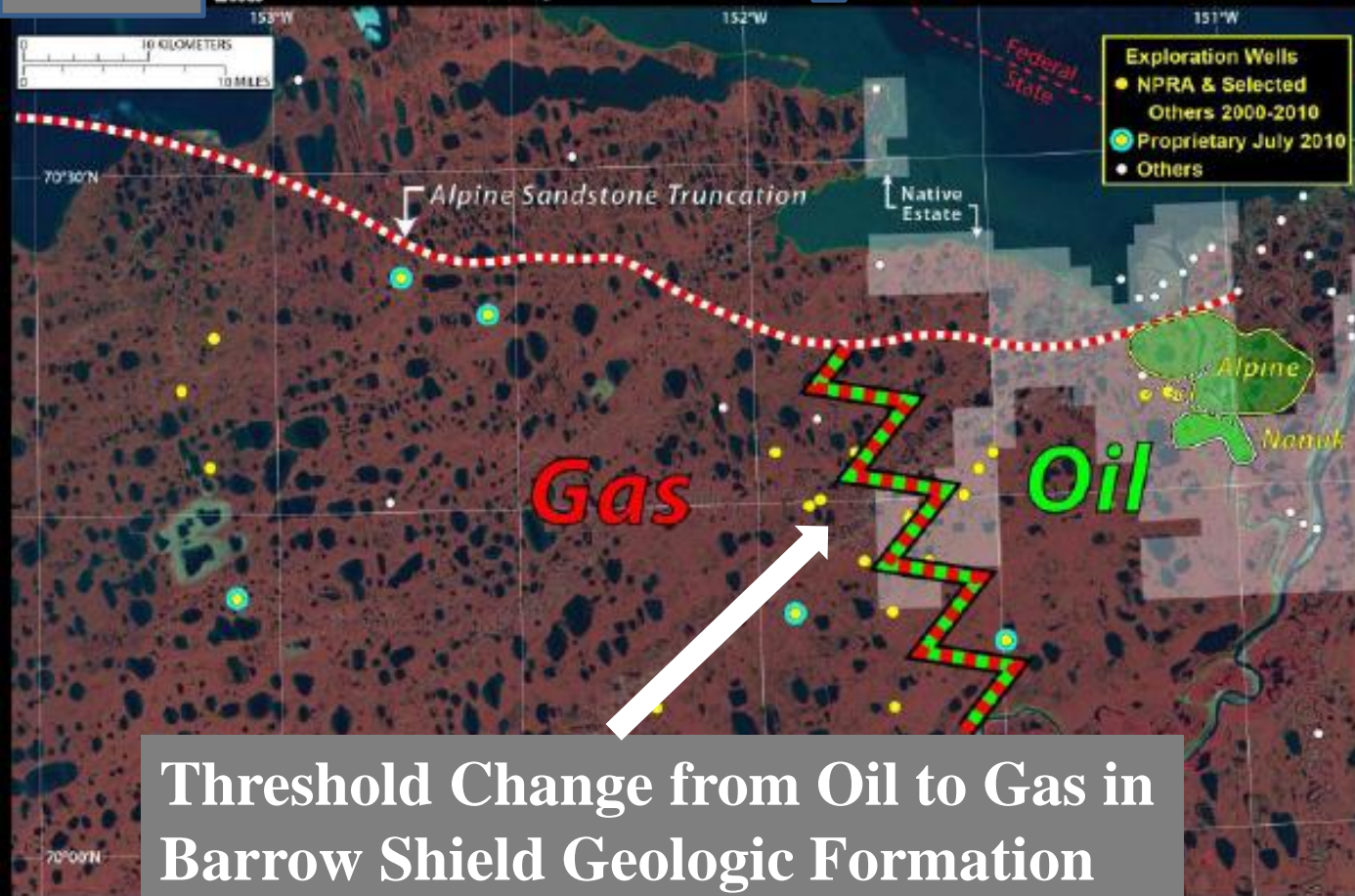
West ← Increased uplift and erosion ← East

Gas fills reservoir ± oil shows e.g., most tests west of Spark-Rendezvous	Gas cap + condensate High GOR Oil displaced downdip into poor quality reservoir e.g., Spark-Rendezvous	Oil fills reservoir "Low" gravity oil No gas cap Low GOR e.g., Alpine
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USGS

Green, oil; red, gas



USGS Report
(Fall 2010):

NPR-A oil only
10% of original
assessments

Threshold Change from Oil to Gas in
Barrow Shield Geologic Formation

Next steps:

- Continue our on-the-ground efforts...driven by conservation issues
- Work with BLM, others, in seeking wildlife protection in NPR-A
- CC Vulnerability Analysis of Arctic Alaska shorebirds
- Collaborate

